UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	LINDEN, *et al.*	Confirmation No.	3797
Serial No.:	10/501,225		
Art Unit:	1715		
Examiner:	TSOY, Elena		
Filed:	February 4, 2005		
For:	**METHOD FOR DEPOSITING INORGANIC/ORGANIC FILMS**		

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Sir:

This is an appeal from the final rejection of claims 1, 3-5, 8-10, 12, 17-22 and 34-35 made in the Final Office Action of June 16, 2010 in the referenced application ("Final Office Action"). For the reasons discussed below, Appellants request reversal of the rejection of the claims and allowance thereof.

A Notice of Appeal was filed on December 16, 2010 and a petition for request of a one month extension of time is filed concurrently herewith, making the filing of this Appeal Brief timely.

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I. REAL PARTY IN INTEREST

The real party in interest is **NEDERLANDSE ORGANISATIE VOOR TOEGEPAST** of Delft, Netherlands, the assignee of record.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Claims 1, 3-5, 8-10, 12, 17-22 and 34-35 are currently rejected and are presented on appeal.

A copy of the claims presented on appeal is attached in Section VIII, Claims Appendix.

IV. STATUS OF THE AMENDMENTS

No amendments to the claims have been filed subsequent to the Final Rejection of June 16, 2010.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent claim 1 recites a method for applying a hybrid coating to a substrate. The coating comprises an organic and inorganic component, wherein the inorganic component comprises nanoparticles. The precursors of the organic and inorganic components are activated in two or more separate plasma sources for deposition of a chemical vapor phase and are combined before being deposited on the substrate. The inorganic component is generated in high electron density high-frequency plasma which is pulsed.

Support for independent claim 1, as pending, is found on page 2, lines 13-27, page 6, lines 15-22, page 10, lines 15-16 and page 14, lines 18-20 of the specification originally filed.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1, 3-5, 8-10, 12, 17-22 and 34-35 are unpatentable under 35 U.S.C. § 103(a) over Yamada et al. (U.S. Patent No. 5,024,927, hereinafter "Yamada") in view of Saito et al. (U.S. Patent No. 5,021,114, hereinafter "Saito") and further in view of Otto et al. (U.S. Patent No. 5,643,638, hereinafter "Otto").

VII. ARGUMENT

Pending claims 1, 3-5, 8-10, 12, 17-22 and 34-35 were finally rejected under 35 U.S.C. § 103 (a) for allegedly being unpatentable over Yamada in view of Saito and further in view of Otto (Final Office Action, page 2).

Appellants discuss below the errors made by the Examiner and how, in view of these errors, the claims would not have been rendered obvious by the combination of the cited references to one skilled in the art.

The presently claimed invention is directed to a method for applying a hybrid coating to a substrate, wherein the coating comprises an organic and an inorganic component whose precursors are activated in two or more plasma sources for pulsed plasma activated deposition of a chemical vapor phase. The activated precursors are combined before being deposited on the substrate. (*e.g.*, page 2, lines 13-27, page 6, lines 15-22, page 10, lines 15-16 and page 14, lines 18-20).

Yamada does not disclose Appellants' invention. Yamada only provides for an information recording medium comprising a substrate and a recording layer formed thereon which comprises a carbon-based material and an optically reversible material (*e.g.*, col. 4, lines 50-57). The film of optically reversible material must be prepared under specific conditions to be capable to reversibly turn from an amorphous phase to a crystalline phase and vice versa (*e.g.*, col. 5, lines 52-55 and col. 6, lines 20-27). Yamada is completely silent with regard to pulsed plasma formation and with regard to inorganic and organic components being activated and combined before being deposited on the substrate.

Saito also does not disclose Appellants' invention nor does it provide for Yamada's missing link. Saito describes a method and an apparatus capable of forming a film of high

quality uniformly on a substrate without damaging the substrate (*e.g.*, col. 2, lines 61-65). Saito, as Yamada above, is also completely silent with regard to pulsed plasma and with regard to organic and inorganic precursors being activated and combined before being deposited on a substrate.

Otto only describes a method to adjust layer gradients with high precision even for very thin layers (*e.g.*, col. 2, lines 33-37). The method consists in a plasma power being applied in a pulsed manner and in a layer gradient being adjusted in the direction of the layer growth by changing the plasma power parameters of: pulsed amplitude, pulse width and/or pulse interval (*e.g.*, col. 2, lines 39-44).

Thus, for the following reasons, it is respectfully submitted that the presently claimed subject matter would not have been rendered obvious by the combination of the cited references.

As an initial matter the combination of Yamada and Saito with Otto is not the presently claimed invention because it does not disclose all of the claimed limitations.

As discussed above, none of the cited references, either alone or in combination describes inorganic and organic components being activated and combined before being deposited on the substrate

Further, Yamada teaches a recording layer consisting of an optically reversible material which can turn from an amorphous phase into a crystalline phase and vice versa, depending upon whether the information is recorded or erased. Because of these specific characteristics, the parameters of gas pressure, electric power applied, discharging time and the temperature of the substrate are kept at a particular range value during the formation of the film.

As set forth above, Saito discloses a method to prepare uniform films of high quality.

It is settled law that the prior art must be considered in its entirety, i.e., as a whole including portions that would lead away from the claimed invention. *W.L. Gore & Associate, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied* 469 U.S. 851 (1984).

Accordingly, Otto cannot be considered only with regard to the pulsed plasma, but rather with regard to the preparation of layer gradients as well. However, Yamada and Saito cannot be modified and redesigned, because the combination with Otto would lead to the formation of layer gradients and thus this modification would change the basic principle under which both Yamada and Saito were intended to operate. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Thus, because the proposed modification of the teachings of Yamada and Saito would change their principle of operation, i.e., the principle of operation of the inventions being modified, the teachings of the combination of Yamada and Saito with Otto cannot render the claims *prima facie* obvious.

Further, the strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. *In re Sernaker*, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983). See also *Dystar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick*, 464 F.3d 1356, 1368, 80 USPQ2d 1641, 1651 (Fed. Cir. 2006)

This is not the case. The combination of the teachings of Yamada and Saito with Otto would not produce a more desirable product so as to justify a motivation to combine their teachings. On the contrary, a person of ordinary skills would have no reasonable expectation of success that the methods described by Yamada and Saito would be successful or at least would

improve if modified to incorporate the pulsed plasma described by Otto. Accordingly, without a reasonable expectation of success, a prior art cannot be modified or combined to reject claims as *prima facie* obvious. *In re Merck & Co.*, Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Thus, unless the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art the claims would not have been obvious. *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, __, 82 USPQ2d 1385, 1395 (2007); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 40 U.S. 147, 152, 87 USPQ 303, 306 (1950).

On page 3 of the Final Office Action the Examiner refers to the article "Kersten et al" cited on col. 2, lines 45-58 of Otto ("In these methods, the electromagnetic radiation which excites the plasma is supplied in a pulsed manner for continuous flow of the coating gases. With each pulse, a thin layer is deposited on the substrate. Even substrates which are not stable to temperature can be deposited during a pulse of high power because a pulse interval follows each power pulse. In this way, especially high coating rates are possible without significant temperature loading of the substrate"). The Examiner has interpreted the above-paragraph as saying that Otto does not teach that pulsed plasma was known to be limited to particular applications to achieve high coating rates and that it is irrelevant that Otto teaches that pulsed plasma may be used for producing the gradient layer (*e.g.*, page 3-4 of the Final Office Action).

This is incorrect.

First, Otto teaches pulsed plasma methods applied to the preparation of gradient layer and nowhere does it describe that the method can be applied to anything else. Second, Kersten is not used as a reference on which to base a prima facie case of obviousness. Only the statement reported in the "Summary of the Invention" of Otto can be used for allegedly rejecting the claims, and nothing in that statement suggests that Otto teaches that pulsed plasma may be used to achieve something different from gradient layers.

Moreover, a person skilled in the art would not be able to use the teaching of Kersten to render obvious the presently claimed subject matter. At best, a person of ordinary skill could try to combine the teachings of Yamada and Saito with the disclosure of Otto.

However, as discussed above, and in contrast with the Examiner's assertion, Otto does not provide the skilled person with an incentive to use the pulsed plasma system in the method of Yamada and Saito. The references simply do not provide the motivation to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006). Accordingly, Appellants submit that the statement that the modifications of the prior art meet to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" is not sufficient to establish a *prima facie* case of obviousness because there are no objective reasons to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

Thus, for all of these reasons, the Examiner's bases for a prima facie obviousness rejection are erroneous and based on impermissible hindsight.

Accordingly, it is respectfully submitted that the combination of the cited references would not have rendered obvious the subject matter of claims 1, 3-5, 8-10, 12, 17-22 and 34-35 to one skilled in the art. Therefore, Appellants assert that the rejection under 35 U.S.C. § 103(a)

over Yamada and Saito and further in view of Otto is untenable and improper and should be reversed.

VIII. CLAIMS APPENDIX

1. A method for applying a hybrid coating to a substrate, which coating comprises an inorganic and an organic component and which inorganic component comprises nanoparticles, wherein precursors for said organic and inorganic components are activated in two or more separate plasma sources for plasma activated deposition of a chemical vapor phase, wherein said activated precursors are combined before they are deposited on the substrate from the chemical vapor phase for forming the coating, and wherein the inorganic component is generated in a high electron density high-frequency plasma and wherein the high electron density high-frequency plasma is pulsed.

3. A method according to claim 1, wherein one of the two activated precursors passes the plasma for activation of the other precursor, whereafter said activated precursors are combined.

4. A method according to claim 3, wherein the activated inorganic precursor passes the plasma for activation of the organic precursor.

5. A method according to claim 3, wherein the activated organic precursor passes the plasma for activation of the inorganic precursor.

8. A method according to claim 1, wherein the organic component is generated in a low electron density high-frequency plasma.

9. A method according to claim 8, wherein the low electron density high-frequency plasma is pulsed.

10 A method according to claim 1, wherein the precursor for the inorganic component comprises metal-carbon, metal-hydrogen, metal-nitrogen, metal-halide, and/or metal-oxygen bonds.

12. A method according to claim 10, wherein the metal comprises aluminum, titanium, zirconium, molybdenum, cesium, tin and/or platinum.

17. A method according to claim 1, wherein the precursor for the organic component comprises an organosilicon compound, organometal compound, metal organic compound or p-xylene, and/or optionally functionalized compounds derived therefrom.

18. A method according to claim 1, wherein the separate activation sources are situated in a reactor in which a pressure of between 0.01 and 1000 mbar prevails.

19. A method according to claim 1, wherein the separate activation sources are situated in a reactor in which a pressure of 0.1 to 50 mbar prevails.

20. A method according to claim 1, wherein the plasma are formed by bringing a mixture of precursor material, argon gas and optionally oxygen to electrical discharge.

21. A method according to claim 1, wherein to the low electron density plasma, also vapor coming from the high electron density plasma is supplied.

22. A method according to claim 1, wherein to the high electron density plasma, also vapor coming from the low electron density plasma is supplied.

34. The method of claim 1, wherein the high electron density high-frequency plasma is pulsed at a pulse frequency of from about 1 to about 100 Hz.

35. The method of claim 1, wherein the pulse frequency is 25 Hz with a duty cycle between about 5% to about 10%.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

FEES

Payment by credit card in the amount of Five Hundred Forty Dollars ($540.00) is being concurrently made with the filing of this paper to cover the fee set forth in 37 C.F.R. §41.20(b)(2) for a large entity.

It is believed that no fees other than those paid concurrently are due in connection with the filing of this paper. However, should it be deemed that any other fee is due in connection with this paper, authorization is hereby given to charge such fee to Deposit Account No. 02-2275.

Respectfully submitted

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LUCAS & MERCANTI, LLP

By: /Silvia Salvadori/
Silvia Salvadori, Reg. No. 48,265
475 Park Avenue South
New York, NY 10016
Phone: (646) 783-6758
Fax: (212) 661-8002